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VERTICILLIUM DISEASE OF CULTIVATED MUSHROOMS

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Mushrooms have been cultivated in the United States since the latter part of the 19th century (8). Mushroom culture began in France after the year 1600 as an outgrowth of melon production on piles of manure (1). The commercial mushroom is Agaricus bisporus (Lange) Moeller and Schaeff. Mushrooms differ from green plants in that mushrooms cannot manufacture their own carbohydrates. For this reason, they are grown in organic compost which contains carbohydrates (8).

The Verticillium disease of cultivated mushrooms is caused by the fungus, Verticillium fungicola (Preuss) Hassebrauk (2). It is commonly known throughout the mushroom industry as Verticillium malthousei Ware (4, 6, 8, 9, 11). Verticillium disease is also known as brown spot (3, 4) or dry bubble disease (2, 5, 7, 10). Verticillium brown spot can cause serious losses to mushroom beds if they are attacked early after casing. (Casing is a layer of moisture-retentive material which covers the spawned compost.) The Verticillium disease is regarded as the most widespread and destructive of the diseases of mushrooms, and the pathogen, once it is established, can spread rapidly throughout a bed (1).

SYMPTOMS. This fungus causes light brown, superficial, irregular spots on the cap (pileus) of the mushrooms. These later enlarge and may coalesce into dark brown blotches (fig. 1). With severe attacks, the mushrooms become distorted with abnormal swelling of the stalk (stipe). The tissues eventually dry out and become leathery.

Another fungus disease of mushrooms is caused by Verticillium psalliotae Treschow. The symptoms of this disease are very similar to those caused by Verticillium fungicola. Both fungi may cause brown spotting of the cap, often with distorted growth and subsequent shriveling of the mushrooms that result in large losses to the growers (3).

Fig. 1. Brown spot, caused by Verticillium fungicola (Preuss) Hassebrauk (V. malthousei Ware), on commercial mushroom, Agaricus bisporus.

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CONTROL. Control of brown spot is best achieved by sanitation to prevent the spread of inoculum and the contamination of casing materials. Disinfest the beds by heating to 55 C for 4 hours, or 1 hour at 60 C. Rogue or isolate mushrooms showing early symptoms. Zineb, benomyl, or maneb are the standard fungicides used for controlling this disease (6). Increased tolerance of this fungus to benomyl has been reported by Lambert and Wuest (7). Recently, de Trogoff and Ricard (4) reported spraying the casing soil with the fungus Trichoderma viride sensu Bisby and obtaining effective control of Verticillium fungicola (V. malthousei).

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